1   1.   A system comprising:

2   at least one first conductive element in contact with at least one dielectric mismatch

3   boundary;

4   at least one second conductive element in contact with the at least one dielectric

5   mismatch boundary; and

6   a receiver for receiving an electromagnetic signal from the at least one second conductive

7   element, the received electromagnetic signal being based on an electromagnetic signal

8   transmitted on the at least one first conductive element and being coupled to the at least one

9   second conductive element in response to the at least one dielectric mismatch boundary.

1   2.   The system of claim 1 further comprising a third conductive element surrounding at least

2   part of the at least one first and second conductive elements and being connected to a ground

3   plane.

1   3.   The system of claim 1 wherein the at least one first and second conductive elements are

2   positioned substantially parallel to each other and substantially perpendicular to the at least one

3   dielectric mismatch boundary.

1   4.   The system of claim 1 wherein the at least one dielectric mismatch boundary corresponds

2   to a region associated with at least one first substance having a first dielectric constant and at

3   least one second substance having a second dielectric constant.

1   5.   The system of claim 1 wherein the electromagnetic signal exhibits an ultra-wideband

2   frequency.

1   6.   The system of claim 1 wherein the at least one dielectric mismatch boundary corresponds

2   to a transitional region between a gaseous substance and a liquid substance.

1   7.   The system of claim 1 wherein the at least one dielectric mismatch boundary corresponds

2   to a transitional region between at least two of a vacuum, a gaseous substance, a liquid

3   substance, a semi-solid substance, and a solid substance.

1   8.   The system of claim 1 further comprising a transmitter for forming the electromagnetic

2   signal.

1   9.   The system of claim 1 further comprising a processing element executing instructions to

2   evaluate the received electromagnetic signal relative to the transmitted electromagnetic signal to

3   determine a characteristic of at least one substance associated with the dielectric mismatch

4   boundary.

1   10.   The system of claim 9 wherein the processing element communicates at least one of the

2   attributes of the received electromagnetic signal and the characteristic of the at least one

3   substance to a digital data processing device during a communication session.

1   11.   The system of claim 9 wherein the attributes of the received electromagnetic signal

2   relative to the transmitted electromagnetic signal includes a time delay and the characteristic of

3   the at least one substance corresponds to a level of that substance.

1   12.   The system of claim 11 wherein the time delay attribute of the received electromagnetic

2   signal relative to the transmitted electromagnetic signal is based, at least in part, on a time

3   differential between signals associated with an equivalent time sampling circuit of the receiver.

1   13.   The system of claim 11 wherein the level corresponds to a volume of fluid in at least one

2   of an above-ground storage tank and a below-ground storage tank.

1   14.   The system of claim 1 wherein the at least one first and second conductive elements form

2   a parallel conductor transmission line structure.

1   15.   The system of claim 1 wherein the at least one first and second conductive elements are

2   flexible.

1   16.   The system of claim 1 wherein the at least one first and second conductive elements

2   exhibit quadrilateral cross-sections.

1   17.   The system of claim 1 wherein the at least one first and second conductive elements

2   exhibit substantially identical cross-sections.

1   18.   The system of claim 1 further comprising:

2   a coupler positioned at the dielectric mismatch boundary for coupling the received

3   electromagnetic signal, the size of the received electromagnetic signal being independent of

4   dielectric properties associated with substances forming the dielectric mismatch boundary.

1   19.   The system of claim 18 wherein the coupler operates as an electromagnetic shunt path

2   between the at least one first and second conductive elements.

1   20.   The system of claim 18 wherein the coupler exhibits a length corresponding to at least

2   one-quarter of a propagation velocity pulse length of the transmitted electromagnetic signal.

1   21.   The system of claim 18 further comprising:

2   a float for positioning the coupler relative to the at least one dielectric mismatch

3   boundary.

1   22.   The system of claim 21 wherein the float includes a buoyant component and a weighted

2   component.

1   23.   A method comprising:

2   transmitting an electromagnetic signal on an at least one first conductive element, the first

3   conductive element being in contact with an at least one dielectric mismatch boundary; and

4   receiving an electromagnetic signal based on the transmitted electromagnetic signal at an

5   at least one second conductive element, the received electromagnetic signal being coupled to the

6   at least one second conductive element in response to the at least one dielectric mismatch

7   boundary, wherein the at least one second conductive element is in contact with the at least one

8   dielectric mismatch boundary.

1   24.   The method of claim 23 further comprising:

2   surrounding at least part of the at least one first and second conductive elements with a

3   third conductive element connected to a ground plane.

1   25.   The method of claim 23 further comprising:

2   evaluating attributes of the received electromagnetic signal relative to the transmitted

3   electromagnetic signal to determine a characteristic of at least one substance associated with the

4   dielectric mismatch boundary

1   26.   The method of claim 25 wherein the attributes of the received electromagnetic signal

2   relative to the transmitted electromagnetic signal includes a time delay and the characteristic of

3   the at least one substance corresponds to a level of that substance.

1   27.   The method of claim 23 wherein the at least one first and second conductive elements are

2   flexible.

1   28.   The method of claim 23 further comprising:

2   providing a coupler positioned at the dielectric mismatch boundary for coupling the

3   received electromagnetic signal to the at least one second conductive element, the size of the

4   received electromagnetic signal being independent of dielectric properties associated with

5   substances forming the at least one dielectric mismatch boundary.

1   29.   The method of claim 28 further comprising:

2   providing a float for positioning the coupler relative to the at least one dielectric

3   mismatch boundary.